

In the Claims

The following is a complete listing of the claims and replace all prior claims in the application:

1 1. (Withdrawn) A method for forming self-pinned abutted junction heads,
2 comprising:

3 forming a free layer having a first end and a second end defining a width selected
4 to form a desired trackwidth; and

5 forming an extended self-pinned bias layer extending beyond the ends of the free
6 layer, the self-pinned bias layer extending beyond the free layer increasing the volume of
7 the extended self-pinned bias layer to provide greater thermal stability and stronger
8 pinning of the free layer.

1 2. (Withdrawn) The method of claim 1 further comprising forming a self-
2 pinned layer on a side of the free layer opposite the self-pinned bias layer, the self-pinned
3 layer extending beyond the ends of the free layer wherein the free layer is disposed at a
4 central region of the self-pinned layer.

1 3. (Withdrawn) The method of claim 2, wherein the forming the self-pinned
2 bias layer and the self-pinned layer further comprises forming a self-pinned bias layer
3 and a self-pinned layer having increased stress anisotropy.

1 4. (Withdrawn) The method of claim 1 further comprising forming a spacer
2 layer between the free layer and the self-pinned bias layer.

1 5. (Withdrawn) The method of claim 1 further comprising forming a first
2 shield layer interleaving the self-pinned layer between the first shield layer and the free
3 layer and forming a second shield layer interleaving the self-pinned bias layer between
4 the second shield layer and the free layer.

1 6. (Withdrawn) The method of claim 5 further comprising forming a first
2 seed layer between the first shield layer and the self-pinned layer and forming a second
3 seed layer between the self-pinned bias layer and the second shield layer.

1 7. (Withdrawn) The method of claim 1, wherein the forming the extended
2 self-pinned bias layer further comprises forming the extended self-pinned bias layer with
3 a large negative magnetostriction.

1 8. (Withdrawn) The method of claim 7 further comprising forming a self-
2 pinned layer on a side of the free layer opposite the self-pinned bias layer, the self-pinned
3 layer having a large positive magnetostriction.

1 9. (Currently Amended) A self-pinned abutted junction magnetic read
2 sensor, comprising:

3 a free layer having a first end and a second end defining a width selected to form
4 a desired trackwidth; and

5 a self-pinned ferromagnetic bias layer extending beyond the ends of the free layer;
6 ~~the self-pinned ferromagnetic bias layer extending beyond the free layer to increase the~~
7 ~~volume of the extended self pinned bias layer thereby improving thermal stability and~~
8 ~~pinning of the free layer.~~

1 10. (Currently Amended) The sensor of claim 9 further comprising a self-
2 pinned layer formed on a side of the free layer opposite from the self-pinned bias layer,
3 the self-pinned layer extending beyond the ends of the free layer wherein the free layer is
4 disposed at a central region of the self-pinned layer and ~~wherein the self pinned bias layer~~
5 ~~and the self pinned layer have increased stress anisotropy.~~

1 11. (Previously Presented) The sensor of claim 9 further comprising a
2 first and second hard bias layer abutting at least a portion of the first and second ends of
3 the free layer in a longitudinal direction.

1 12. (Previously Presented) The sensor of claim 9 further comprising a
2 spacer layer formed between the free layer and the self-pinned ferromagnetic bias layer.

1 13. (Previously Presented) The sensor of claim 9 further comprising a
2 first shield layer interleaving the self-pinned layer between the first shield layer and the
3 free layer and a second shield layer interleaving the self-pinned ferromagnetic bias layer
4 between the second shield layer and the free layer.

1 14. (Previously Presented) The sensor of claim 13 further comprising a
2 first seed layer formed between the first shield layer and the self-pinned layer and a
3 second seed layer formed between the self-pinned ferromagnetic bias layer and the
4 second shield layer.

1 15-16. (Canceled)

1 17. (Currently Amended) A magnetic storage system, comprising:
2 a moveable magnetic storage medium for storing data thereon;
3 an actuator positionable relative to the moveable magnetic storage medium; and
4 a magnetoresistive sensor, coupled to the actuator, for reading data from the
5 magnetic recording medium when position to a desired location by the actuator, wherein
6 the magnetoresistive sensor further comprises:
7 a free layer having a first end and a second end defining a width selected
8 to form a desired trackwidth; and
9 a self-pinned ferromagnetic bias layer extending beyond the ends of the
10 free layer, ~~the self pinned ferromagnetic bias layer extending beyond the free layer to~~
11 ~~increase the volume of the extended self pinned bias layer thereby improving thermal~~
12 ~~stability and pinning of the free layer.~~

1 18. (Currently Amended) The magnetic storage system of claim 17 further
2 comprising a self-pinned layer formed on a side of the free layer opposite from the self-
3 pinned bias layer, the self-pinned layer extending beyond the ends of the free layer
4 wherein the free layer is disposed at a central region of the self-pinned layer ~~and wherein~~
5 ~~the self pinned bias layer and the self pinned layer have increased stress anisotropy.~~

1 19. (Previously Presented) The magnetic storage system of claim 17
2 further comprising a first and second hard bias layer abutting at least a portion of the first
3 and second ends of the free layer in a longitudinal direction.

1 20. (Previously Presented) The magnetic storage system of claim 17

2 further comprising a spacer layer formed between the free layer and the self-pinned
3 ferromagnetic bias layer.

1 21. (Previously Presented) The magnetic storage system of claim 17

2 further comprising a first shield layer interleaving the self-pinned layer between the first
3 shield layer and the free layer and a second shield layer interleaving the self-pinned
4 ferromagnetic bias layer between the second shield layer and the free layer.

1 22. (Previously Presented) The magnetic storage system of claim 21

2 further comprising a first seed layer formed between the first shield layer and the self-
3 pinned layer and a second seed layer formed between the self-pinned ferromagnetic bias
4 layer and the second shield layer.

1 23-24. (Canceled)

1 25. (Currently Amended) A self-pinned abutted junction magnetic read
2 sensor, comprising:

3 means for sensing having a first end and a second end defining a width selected to
4 form a desired trackwidth; and

5 self-biased ferromagnetic means for biasing the means for sensing, the self-biased
6 ferromagnetic means for biasing the means for sensing extending beyond the ends of the
7 means for sensing, ~~the extension of the means for biasing the means for sensing to~~
8 ~~increase the volume of the means for biasing to improve thermal stability and pinning of~~
9 ~~the free layer.~~

1 26. (Currently Amended) A magnetic storage system, comprising:
2 a moveable magnetic storage means for storing data thereon;
3 an actuator positionable relative to the moveable magnetic storage medium; and
4 a magnetoresistive sensor, coupled to the actuator, for reading data from the
5 magnetic recording medium when position to a desired location by the actuator, wherein
6 the magnetoresistive sensor further comprises:
7 means for sensing having a first end and a second end defining a width
8 selected to form a desired trackwidth; and
9 self-biased ferromagnetic means for biasing the means for sensing, the
10 self-biased ferromagnetic means for biasing the means for sensing extending beyond the
11 ends of the means for sensing, ~~the extension of the means for biasing the means for~~
12 ~~sensing increasing the volume of the means for biasing to provide greater thermal~~
13 ~~stability and stronger pinning of the free layer.~~